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ABSTRACTS

Edited by DAVID E. ZITARELLI

The purpose of this department is to give sufficient information about the subject matter of each publication to enable users to decide whether to read it. It is our intention to cover all books, articles, and other materials in the field.

Books for abstracting and eventual review should be sent to this department. Materials should be sent to Prof. David E. Zitarelli, Department of Mathematics, Temple University, Philadelphia, PA 19122. U.S.A.

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In order to facilitate reference and indexing, entries are given abstract numbers which appear at the end following the symbol #. A triple numbering system is used: the first number indicates the volume, the second the issue number, and the third the sequential number within that issue. For example, the abstracts for Volume 12, Number 1, are numbered: 12.1.1, 12.1.2, 12.1.3, etc.

For reviews and abstracts published in Volumes 1 through 13 there is an *author index* in Volume 13, Number 4, and a *subject index* in Volume 14, Number 1.

The initials in parentheses at the end of an entry indicate the abstractor. In this issue there are abstracts by Víctor Albis (Bogotá), Stuart Anderson (Commerce, TX), Irving Anellis (Ames, IA), Gary Brown (Collegeville, MN), Craig G. Fraser (Toronto), Albert C. Lewis (Hamilton), Ivica Martinović (Dubrovnik), Neil Porter (Canberra), James C. Satterthwaite (Philadelphia), Erik Sageng (Annapolis), Lynn Arthur Steen (Northfield, MN), Dirk J. Struik (Belmont, MA), and David E. Zitarelli.

BOGOLYUBOV, N. N. MIKHAILOV, G. K., AND YUSHKEVICH, A. P. (Eds.) 1988. *The development of* LEONHARD EULER'S *ideas and modern science*. Moscow: Nauk. 530 pp. [in Russian] (DEZ) #16.4.16

ABALAKIN, V. K., AND GREBENIKOV, E. A. 1988. LEONHARD EULER and the development of ASTRONOMY in Russia. Pp. 237–253 in #16.4.16. [In Russian] (IA) #17.4.1

ABELES, FRANCINE. 1990. LEWIS CARROLL's method of trees: Its origins in *Studies in Logic. Modern Logic* **1**(1), 25–35. An examination of the "method of trees" developed by CHARLES L. DODGSON in 1894. It is shown that the seeds of Peirce's method for testing the validity of complicated multiliteral statements can be found in the earlier work of two of his students at Johns Hopkins, CHRISTINE LADD-FRANKLIN and ALLAN MARQUAND. LOGIC (DEZ) #17.4.2

ABELES, FRANCINE, AND LIPSON, STANLEY H. 1990. Some Victorian periodic polyalphabetic ciphers. *Cryptologia* **XIV**(2), 128–134. This paper puts into historical perspective two polyalphabetic ciphers invented by CHARLES L. DODGSON (LEWIS CARROLL) CRYPTOLOGY. (DEZ) #17.4.3

ACKERMANN, HANS RICHARD. 1983. Aus dem Briefwechsel Wilhelm Ackermanns. *History and*

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Philosophy of Logic **4**, 181–202. A selection from W. ACKERMANN's correspondence. Includes letters to Bernays, Scholz, and Lorenzen. *Mathematical Reviews* **85c:**01031. (ACL) #17.4.4

ALBERS, D. J., AND ALEXANDERSON, G. L. 1990. A conversation with Robin Wilson. *The College Mathematics Journal* **21**(3), 178–195. An interview with the graph theorist ROBIN WILSON covering his early fascination with numbers, his unusual education, his musical interests, his academic positions, and the founding of the Open University. The son of a former Prime Minister of England, Wilson reflects on life at No. 10 Downing Street. PHOTOS. (DEZ) #17.4.5

ALEXANDERSON, G. L. *See* #17.4.5.

AMBURGER, E. N., GEKKER, I. R., AND MIKHAILOV, G. K. 1988. Genealogical list of the descendants of LEONHARD EULER. Pp. 382–467 in #16.4.16. [In Russian] (IA) #17.4.6

ANDREEVA, G. B., AND VIKTURNINA, M. P. 1988. An unknown portrait of LEONHARD EULER painted by J. F. Darbes. Pp. 345–352 in #16.4.16. Brief biographical sketch of JOSEPH F. A. DARBES (1747–1810) and a description of his 1778 painting of EULER. A black-and-white reproduction of the portrait, which hangs in the Tretyakov Museum in Moscow, is included, along with a reproduction of the famous 1780 engraving by S. G. KUTNER based on Darbes' painting. [In Russian] (IA) #17.4.7

ANDREWS, GEORGE E. 1988. J. J. SYLVESTER, JOHNS HOPKINS, and PARTITIONS. Pp. 21–40 in #17.4.56. "It is my firm belief that Sylvester's paper ['A constructive theory of partitions, arranged in three acts, an interact and an exodion'] still deserves study." To this end, the author presents a new proof of one of Sylvester's identities and a generalization of this result which leads to a new proof of the Rogers–Ramanujan identities. (ACL) #17.4.8

ANELLIS, IRVING H. 1990. From semantic tableaux to Smullyan trees: A history of the development of the falsifiability tree method. *Modern Logic* **1**(1), 36–69. This paper traces the contemporary history of the TREE METHOD from its origins in the Gentzen sequent-calculus and the method of natural deduction through its evolution as the SMULLYAN TREE from BETH TABLEAUX and HINTIKKA'S THEORY OF MODEL SETS. It also considers VAN HEIJENOORT's more general work on TRUTH TREES and his proof of the completeness of the tree method. LOGIC. (DEZ) #17.4.9

ANELLIS, IRVING H. (Ed.) 1990. Introducing *Modern Logic*. *Modern Logic* **1**(1), 1–2. The editor's description of a new international JOURNAL that publishes historical studies and expository surveys of 19th and 20th century mathematical LOGIC SET, THEORY, and FOUNDATIONS OF MATHEMATICS. (DEZ) #17.4.10

APPEL, K., AND HAKEN, W. 1989. *Every planar map is four colorable*. Providence: American Mathematical Society. 741 pp. Softcover. $80. The authors present their 1972 proof of the celebrated FOUR COLOR THEOREM. The 31-page introduction provides historical background. (DEZ) #17.4.11

ARCHIBALD, THOMAS. 1989. Physics as a constraint on mathematical research: The case of potential theory and electrodynamics. Pp. 29–75 in #17.3.162. An outline of the complex interaction between the mathematical theory of the POTENTIAL and the physical theory of ELECTRODYNAMICS in Germany between approximately 1840 and 1880, with detailed discussion of the contributions of Gauss, Franz Neumann, Dirichlet, Helmholtz, Kirchhoff, Clausius, Riemann, Carl Neumann, and Otto Hölder. The author argues that the development of the two theories formed a unified research program, in which physical problems both stimulated mathematical research and channeled it in certain directions. During the four decades in question, the potential evolved conceptually from a mathematical tool into a form of physical energy, in terms of which the law of conservation of energy could be stated. Toward the end of the period, when most of the problems important to physicists had been worked out, potential theory returned to the realm of pure mathematics, partially in response to the Weierstrassian critique of the foundations of analysis. (JCS) #17.4.12

ARNOLD, WOLFGANG. *See* #17.4.193.

ARTMANN, BENNO. 1988. Über voreuklidische 'Elemente der Raumgeometrie' aus der Schule des Eudoxos. *Archive for History of Exact Sciences* **39**, 121–135. On a pre-Euclidean *Elements of spatial geometry* from the school of EUDOXUS. An attempt is made to reconstruct a work immediately prior to EUCLID's *Elements* and which ends with the volume calculations of Euclid's Book XII. (ACL) #17.4.13

ASKEY, R. A. *See* #17.4.56.

ASPRAY, WILLIAM. 1990. Logic machines. Pp. 99–121 in #17.4.16. An essay on the development of calculating technologies that are able to make logical decisions. It discusses the LOGIC MACHINES of Lord Charles Stanhope, Alfred Smee, William Stanley Jevons, John Venn, and Allan Marquand in the 19th century, Benjamin Burack in 1936, Harvard undergraduates William Burkhardt and Theodore Kalin in 1947, and Hao Wang in 1960. It ends by examining the work of CLAUDE SHANNON and ALLAN TURING. (DEZ) #17.4.14

ASPRAY, WILLIAM. 1990. The transformation of NUMERICAL ANALYSIS by the computer: An example from the work of John von Neumann. Pp. 307–322 in #17.4.162. Actually the paper illustrates two examples supporting the claim that JOHN VON NEUMANN is one of the originators of the modern discipline of numerical analysis, a subject that was refocused by the introduction of the COMPUTER. The article analyzes von Neumann's methods for solving partial differential equations and his use of Monte Carlo methods. (DEZ) #17.4.15

ASPRAY, WILLIAM (Ed.) 1990. *Computing before computers*. Ames: Iowa State Univ. Press. x + 266 pp. Hardcover. $27.95. A survey of computing technology prior to the development of modern COMPUTERS in about 1945, consisting of essays by Michael R. Williams, Allan G. Bromley, William Aspray, Martin Campbell-Kelly, and Paul Ceruzzi, all of which are abstracted separately. In the epilog the editor argues that the computer is part of the evolution of calculating technologies, and it "may not be the revolutionary technology some people suppose it to be." (DEZ) #17.4.16

AUSEJO, ELENA, AND MILLÁN, ANA. 1987. *Diez años de LLULL, Revista de la Sociedad Española de Historia de la Ciencia y de las Técnicas: Índice de volúmenes 1–10 (1977–1987)*. Zaragoza: SEHCYT. 40 pp. Foreword by Mariano Hormigón. Analytic Index of the first 10 years of *LLULL*. (VA) #17.4.17

AUSEJO, ELENA, AND MILLÁN, ANA. 1989. La organización de la investigación mathemática en España, en el primer tercio del siglo XX: El laboratorio y seminario matemático de la Junta de Amplicación de Estudios e Investigaciones Científicas (1915–1938). LLULL **12** (23), 261–308. SPANISH MATH RESEARCH. 20th Century. REY PASTOR. ÁLVAREZ UDE. PLANS. TERRADAS. BARINAGA. (VA) #17.4.18

AUSEJO, ELENA. *See* #17.4.187.

AXLER, SHELDON. 1990. Dedication. *The Mathematical Intelligencer* **12**(2), 3. The entire issue of the journal is dedicated to ALLAN SHIELDS (1927–1989). Included are articles on Shields by his wife (pp. 4–7), colleagues (p. 20), and departmental secretary (pp. 21–22). Articles by Harold Shapiro, Peter Duren, Joel H. Shapiro, and Donald Sarason are abstracted separately. (DEZ) #17.4.19

BANICHUK, N. B., AND ISHLINSKII, A. YU. 1988. LEONHARD EULER and elastic MECHANICAL SYSTEMS. Pp. 208–228 in #16.4.16. [In Russian] (IA) #17.4.20

BASHMAKOVA, I. G. 1988. LEONHARD EULER's contribution to algebra. Pp. 139–152 in #16.4.16. Presents the historical background for the areas in algebra to which Euler contributed, and surveys his work on the fundamental theorem of ALGEBRA, solutions of equations with radical roots, the problems of locating rational points of curves of genus 1 and degree 3, Fermat's Great Theorem, and the introduction of integral algebraic numbers. [In Russian] (IA) #17.4.21

BERGGREN, J. L. *See* #17.4.50.

BERNOULLI, JOHANN I. 1988. *Der Briefwechsel von Johann I. Bernoulli Volume II: Der Briefwechsel mit Pierre Varignon, Erster Teil: 1692–1702*. Edited with commentary by P. Costabel and J. Peiffer. Basel/Boston/Berlin: Birkhäuser. xviii + 442 pp. Reviewed by L. Feigenbaum in *Isis* **80**(4), 698–699. The publication of the collection of papers and letters of the Bernoulli family began in 1955 with a volume of correspondences between Johann I. Bernoulli and Marquis de L'Hôpital. This current volume contains correspondence between JOHANN I. BERNOULLI and PIERRE VARIGNON during the decade following Johann's visit to Paris in 1692 that "revolutionized French mathematics" with regard to the new CALCULUS. Varignon's attitude toward the calculus rapidly evolved during this period from skepticism to enthusiastic support. (GB) #17.4.22

BERS, LIPMAN. 1988. The European mathematicians' migration to America. Pp. 231–243 in #17.4.56. Personal recollections and analysis of the movement to America of European mathematicians before and during World War II. Reactions of Americans through the post-war period and a related paper by G. D. Birkhoff are discussed. (SA) #17.4.23

BIAGIOLI, MARIO. 1990. Galileo's system of patronage. *History of Science* **28**, 1–62. The author indicates "the categorical limits inherent in both Kuhnian and older historiographies in terms of how much integration they can allow between social and conceptual dimensions of early modern science." He attempts to find these "limits" by linking patronage to the "social-process of self-fashioning of the clients" rather than merely to economic subsistence. He, then, uses the texts and correspondences of GALILEO to find a case study of the "institution of patronage." (GB) #17.4.24

BIERMANN, K.-R. 1988. Did Lambert drive Euler from Berlin? Pp. 93–101 in #16.4.16. Russian translation by I. A. Golovinskii of "Vertrieb J. H. Lambert L. Euler aus Berlin?" Abhandlungen Akad. Wiss. DDR, Abt. Math. (1985), 91–99. It examines the evidence concerning the relations between LAMBERT and EULER and concludes that Lambert and Euler were on good terms with one another. [In Russian] (IA) #17.4.25

BOAS, R. P. 1988. Memories of bygone meetings. Pp. 93–95 in #17.4.56. "There are several [American Mathematical Society] meetings that I recall vividly, but not because of any exciting mathematics that was announced. It's the amusing happenings that stick in my mind." The announcement of the would-be journal *Trivia Mathematica* by N. Wiener and A. Wintner is reproduced. (ACL) #17.4.26

BOAS, R. P. 1990. OTTO NEUGEBAUER: 1899–1990. *Notices of the American Mathematical Society* **37**(5), 541. Obituary. (DEZ) #17.4.27

BOGOLYUBOV, A. N. *See* #17.4.139.

BOLZANO. BERNARD. 1983. *Bernard Bolzano—Gesamtausgabe. Reihe II. Nachlass. B. Wissenschaftliche Tagebücher Band 3*. Erster Teil. Miscellanea mathematica 3. Edited and with a foreword by Bob van Rootselaar and Anna van der Lugt. Stuttgart: Friedrich Frommann Verlag. 216 pp. An installment of BOLZANO's collected works: his mathematical workbook for 1812 to 1813. *Mathematical Reviews* 85b:01097. (ACL) #17.4.28

BRABENEC, ROBERT L. 1990. *Introduction to* REAL ANALYSIS. Boston: PWS-Kent. xiv + 294 pp. Hardcover. $35. A TEXTBOOK on analysis in which four of the 36 sections present historical overviews: A brief history of CALCULUS (pp. 21–25), and historical introductions to continuity (pp. 97–100), differentiation (pp. 117–119), and the integral (pp. 157–162). (DEZ) #17.4.29

BRENNER, J. L. 1990. PHILLIP HALL—A famous mathematician. *Pi Mu Epsilon Journal* **9**(2), 110–111. A few anecdotes about Hall (1904–1982). ALGEBRA. (DEZ) #17.4.30

BROMLEY, ALLAN G. 1990. Analog computing devices. Pp. 156–199 in #17.4.16. An examination of a range of analog devices, including differential analyzers, wind tunnels, network analyzers, and

gunnery computers, used during the 1930s and World War II for scientific and engineering calculations. The work of LORD KELVIN and VANNEVAR BUSH is also discussed. ANALOG COMPUTERS. (DEZ) #17.4.31

BROMLEY, ALLAN G. 1990. Difference and analytical engines. Pp. 59–98 in #17.4.15. After a brief biography of CHARLES BABBAGE this essay discusses his role in the genesis of difference engines and analytical engines, as well as his later calculating engines. It also discusses the difference engine of GEORG SCHEUTZ. (DEZ) #17.4.32

BUSHAW, D. 1983. Wroński's *Canons of logarithms*. *Mathematics Magazine* **56**, 91–97. From the text: "The history of tables of LOGARITHMS glistens with examples of remarkable diligence and ingenuity. There may be no more striking example of cleverness in this area than [the work of] J. M. HOENE-WROŃSKI." *Mathematical Reviews* **85c:**01021. (ACL) #17.4.33

BYRNE, CATRIONA. 1990. The left-handed Pythagoras. *The Mathematical Intelligencer* **12**(3), 52–53. A relief on the cathedral of Notre Dame de Chartres depicts PYTHAGORAS as being left-handed. The location is shown in three PHOTOS. (DEZ) #17.4.34

CAMPBELL-KELLEY, MARTIN. 1990. Punched card memory. Pp. 122–155 in #17.4.15. This essay begins with the development of the Hollerith electric tabulating system for the 1890 U.S. census. It then discusses the roles of HERMAN HOLLERITH, JAMES POWERS, and THOMAS J. WATSON in the commercial development of PUNCHED-CARD MACHINERY and IBM. It ends with a brief look at scientific applications and developments after World War II. (DEZ) #17.4.35

CERUZZI, PAUL. 1990. Electronic calculators. Pp. 223–249 in #17.4.15. This essay traces the critical step in the evolution of COMPUTING from electromechanical relays to electricity, suggesting reasons why vacuum tubes were not introduced earlier. It discusses JOHN MAUCHLY and ENIAC, along with three of its predecessors due to JOHN V. ATANASOFF in the mid-1930s at Iowa State University, HELMUT SCHREYER in the early 1940s in Berlin, and the COLOSSUS at Bletchley Park. It ends with a look at other electronic calculators through the 1950s. COMPUTERS. (DEZ) #17.4.36

CERUZZI, PAUL. 1990. Relay calculators. Pp. 200–222 in #17.4.16. A description of the electromechanical calculators built at three different locations by three different teams of scientists: KONRAD ZUSE at the German Aerodynamics Research Institute in Berlin from 1938 to 1945, GEORGE STIBITZ at Bell Laboratories in the U.S. from 1937 to 1949, and HOWARD AIKEN at Harvard University and IBM from 1937 to 1943. The account mentions the programming work of GRACE HOPPER. COMPUTERS. (DEZ) #17.4.37

CHERN, S.-S. 1988. American DIFFERENTIAL GEOMETRY—some personal notes. Pp. 375–377 in #17.4.56. Chern entered geometry largely because of his professor, Li-Fu Chiang, who got his doctorate under J. Coolidge at Harvard in 1919. (ACL) #17.4.38

COLLATZ, L. 1983. Richard von Mises. *Zeitschrift für Angewandte Mathematik und Mechanik* **63**, 278–280. Contributions of RICHARD VON MISES to NUMERICAL MATHEMATICS. MATHEMATICAL REVIEWS **85b:**01049. (ACL) #17.4.39

COOKE, ROGER. 1989. Abel's theorem. Pp. 389–421 in *The history of modern mathematics. I.*(*See* #17.3.108.) The paper begins with a sketch of the evaluation of algebraic integrals in the 18th century, then examines the work of G. FAGNANO and L. EULER on elliptic integrals. It offers a critical examination of the historical accounts of ABEL'S THEOREM by BRILL and NOETHER, suggesting an alternate explanation regarding Abel's route of discovery. The paper ends with an analysis of the statement and proof of Abel's theorem, including its relation to similar results of CAUCHY. (DEZ) #17.4.40

DADIĆ, ŽARKO. 1989. ŽELJKO MARKOVIĆ 1889–1974: On the occasion of the 100th anniversary of his birth. *Dijalektika* **24**(1–2), 73–78. Evaluation of Marković's scientific work in three fields: differential

equations, mathematics in PLATO and ARISTOTLE, and BOŠKOVIĆ's studies. Includes a bibliography of Željko Marković. [In Croatian] (IM) #17.4.41

DALEN, B. V. 1989. A statistical method for recovering unknown parameters from medieval astronomical tables. *Centaurus* **32**(2), 85–145. The determination of parameter values used for the computation of astronomical tables indicate the origin of the tables. However, in many cases these parameter values are not explicitly mentioned in the table headings and must be recovered from the tabular values by statistical methods. The author describes the method of "statistical estimators" to find accurate approximations to a single unknown parameter. STATISTICS. ASTRONOMY. (GB) #17.4.42

DALMEDICO, AMY DAHAN. 1989. La propagation des ondes en eau profonde et ses développements mathématiques: (Poisson, Cauchy 1815–1825) [Wave propagation in deep water and mathematical developments: (Poisson, Cauchy 1815–1825)]. Pp. 129–170 in #17.4.162. This paper deals with some early contributions to the rigorous development of ANALYSIS in the 19th century spurred by a mathematical prize competition announced by the Académie des Sciences in 1813. The problem was to describe the phenomenon of wave propagation on the surface of a liquid of indefinite depth. An examination of the prize-winning entries by AUGUSTIN-LOUIS CAUCHY and SIMÉON-DENIS POISSON reveals that although their papers were similar in many ways they reached different characterizations of wave propagation. Cauchy's subsequent work redressed his errors and led him to examine various issues of SERIES. (DEZ) #17.4.43

D'AMBROSIO, UBIRATAN. 1988. *Da realidade à acgo. Reflexões sobre educacgo e matemática*. Sao Paulo: UNICAMP/ Summus Editorial. 115 Pp. 2nd Edition. MATH AND PEDAGOGY. (VA) #17.4.44

DA SILVA, CLOVIS PEREIRA. 1989. Una historia social do desenvolvimento da matematica superior no Brasil de 1810 a 1920 [A social history of the development of higher mathematics in BRAZIL from 1810 to 1920]. Doctoral dissertation, University of Sao Paulo. This is the first doctoral thesis in Brazil on the history of mathematics. Completed in the department of history, it covers the period of the monarchy and the early republic after Brazilian independence. The major part of the thesis analyzes 22 doctoral theses in mathematics defended in Brazil in that period. Introductory chapters cover mathematics in PORTUGAL and in Brazil during the 16th, 17th, and 18th centuries. (DEZ) #17.4.45

DAVIS, CHANDLER. 1988. The Purge. Pp. 413–428 in #17.4.56. Effects of government investigations and university hiring and tenure decisions on left-wing mathematicians between 1947 and 1960. (SA) #17.4.46

DEKKER, J. C. E. 1990. Myhill's theory of combinatorial functions. *Modern Logic* **1**(1), 3–21. An expository account of the theory of COMBINATORIAL FUNCTIONS introduced by the English logician JOHN MYHILL (1923–1987) in two papers from 1958 and 1962. (DEZ) #17.4.47

DELGADO, A. J. *See* #17.4.116.

DHOMBRES, JEAN. 1990. Cauchy et le monde mathématique français. *Historia Mathematica* **17**(1), 70–72. List of speakers, with titles of presentations, at an international symposium held July 27–29, 1989, in Paris to discuss the role of CAUCHY in the world of FRENCH MATHEMATICS. (DEZ) #17.4.48

DHOMBRES, JEAN, AND GIUSTI, ENRICO. 1990. Colloque: Ratio—La théorie des proportions de l'Antiquité au XIXème siècle. *Historia Mathematica* **17**(1), 73–75. List of speakers, with titles of presentations, at a meeting held January 9–13, 1989, in Trento, Italy, on the theory of proportions from antiquity to the 19th century. (DEZ) #17.4.49

DILKE, D. A. W. 1987. *Mathematics and measurement*. Berkeley: Univ. of California Press for the British Museum. 64 pp. Reviewed by J. L. Berggren in *Isis* **80**(4), 684–685. The author attempts to "throw light on ancient mathematics and measurement." Chapters 1–3 deal with numeration systems

and the teaching of mathematics; Chap. 4 describes systems for measuring lengths, areas, and volumes; Chaps. 5–8 deal with the uses of mathematics in surveying and architecture. According to the reviewer, "this book has struck a good balance between metrology, practitioners' procedures, and the background of 'high mathematics.'" Disappointments include an absence of any mention of Islamic influence on European algebra and "as if it were established fact, that Nasir al-Din al Tusi's work on trigonometry influenced Regiomontanus." (GB) #17.4.50

DONINI, LUIGI. 1990. The cryptographic services of the Royal British and Italian navies. *Cryptologia* **XIV**(2), 97–127. A comparison of the structure and quality of various aspects of cryptosystems in BRITAIN and ITALY during World War II. The aim is to clarify the cause of the British success in breaking Italian mechanical encipherments. CRYPTOLOGY. (DEZ) #17.4.51

DONOVAN, A., LAUDAN, L., AND LAUDAN, R. (Eds). 1988. *Scrutinizing science: Empirical studies of scientific change*. Norwell, MA: Kluwer Academic Publishers. x + 379 pp. $98. Reviewed by T. Nickles in *Isis* **80**(4), 665–669. *Scrutinizing science* is an example of how history and philosophy of science may fruitfully interact. The product of a 1986 conference at Virginia Tech, "Testing Theories of Scientific Change," this book evaluates some of the "guiding assumptions" made by Kuhnian paradigms. (GB) #17.4.52

DUFFY, CHARLES. 1990. Book review. *Modern Logic* **1**(1), 71–82. A book review of V. A. Bazhanov, *Nikolai Aleksandrovich Vasilev* (Moscow: Nauka. 1988. [In Russian]). More a critical essay than a book review, the reviewer provides details of the life of NIKOLAI ALEKSANDROVICH VASILEV (1880–1940), poet, philosopher, medical doctor, and logician, then gives a critical and historical analysis of his work in LOGIC. Vasilev was deeply influenced by fellow Kazanian, NIKOLAI LOBACHEVSKII. (DEZ) #17.4.53

DUNHAM, WILLIAM. 1990. *Journey through genius: The great theorems of mathematics*. Wiley: New York. xiii + 300 pp. $19.95. A TEXTBOOK for a liberal arts mathematics course that explores some of the major results in mathematics via historical and biographical perspectives. (DEZ) #17.4.54

DUREN, PETER. 1990. In remembrance of ALLEN SHIELDS. *The Mathematical Intelligencer* **12**(2), 11–14. The author recalls being a junior faculty member when Shields was writing his Ph.D. thesis at M.I.T. (DEZ) #17.4.55

DUREN, P. L., ASKEY, R. A., AND MERZBACH, U. C. (Eds.) 1988. *A century of mathematics in America. Part I*. Providence: American Mathematical Society. viii + 477 pp. (History of Mathematics, Vol. 1.) The first of a three-volume collection of original and reprinted articles on MATHEMATICS IN THE UNITED STATES. Original contributions are abstracted separately. (ACL) #17.4.56

EDWARDS, A. W. F. 1987. *Pascal's arithmetical triangle*. London: Griffin and New York: Oxford Univ. Press. 174 pp. Reviewed by J. Yoder in *Isis* **80**(4), 699–700. "More the chronology of an entity than the history of an idea, this book traces the frequent occurrences of . . . Pascal's triangle." "Mathematicians for whom formulas are enough seem to be the intended audience of this book." (GB) #17.4.57

EDWARDS, HAROLD M. 1982. KUMMER, EISENSTEIN, and higher RECIPROCITY LAWS. In *Number Theory Related to Fermat's Last Theorem*, pp. 31–43. Boston: Birkhäuser. *Mathematical Reviews* **85c:**01023. (ACL) #17.4.58

ELENA, ALBERTO. 1989. *A hombros de gigantes: Estudios sobre la primera revolución científica (On the shoulders of giants: Studies on the first scientific revolution)*. Madrid: Alianza Editorial. 196 pp. GALILEO. NEWTON. PASCAL. LONDON ROYAL SOCIETY. (VA) #17.4.59

ENGLEBRETEN, GEORGE. 1982. Leibniz on logical syntax. *Studia Leibnitiana* **14**, 119–126. Holds

that LEIBNIZ is not as important in the history of SYMBOLIC LOGIC as G. FREGE. *Mathematical Reviews* **85c:**01015. (ACL) #17.4.60

EULER, A. A. *See* #17.4.69.

FAJ, ZDRAVKO. 1987. STJEPAN GRADIĆ's opinions on some mathematical problems. *Anali Zavoda za povijesne znanosti Jugoslavenske akademije znanosti i umjetnosti* **24–25,** 33–62. Discusses Gradić's mathematical results in the manuscript *Quaedam meditationes geometricae diversis temporibus a me Stephano Gradio factae* (Bibliotheca Apostolica Vaticana, Cod. Vat. lat. 6921). RAFO PRODANELLI and MARIN GETALDIĆ, mathematicians from Dubrovnik. EVANGELISTA TORRICELLI. MICHELANGELO RICCI. VINCENZO VIVIANI. ARISTAEUS. ISMAEL BOULLIAU. [In Croatian] (IM) #17.4.61

FEIGENBAUM, LENORE. 1987. The center of oscillation versus the textbook writers of the early 18th century. Pp. 193–202 in *From ancient omens to statistical mechanics*. (*See* #17.2.11.) A review of the early history of the problem of computing the center of oscillation of a rigid compound pendulum. The author explains a mistake in the solution made by LOUIS CARRÉ in his textbook of 1700 and traces its propagation in 18th century CALCULUS textbooks. (CGF) #17.4.62

FEIGENBAUM, L. *See* #17.4.22.

FESTINI, HEDA. 1989. Some characteristics of BOŠKOVIĆ's scientific methodology. Pp. 543–548 in #17.4.129. Discusses the following characteristics: the RELATIONSHIP BETWEEN MATHEMATICS AND EXPERIENCE, the PROBABILISTIC CHARACTER OF SCIENTIFIC THEORY, the unobsoletness of scientific theory, and the construction of the theory as the RETRODUCTIVE PROCEDURE in the comparison with C. S. PEIRCE's interpretation of scientific discovery. (IM) #17.4.63

FOLKERTS, MENSO, KNOBLOCH, EBERHARD, AND REICH, KARIN. 1989. *Mass, Zahl und Gewicht: Mathematik als Schlüssel zu Weltverständnis und Weltbeherrschung*. Weinheim: VCH Acta Humaniora. 392 pp. Illustrated. Ausstellungskataloge der Herzog August Bibliothek, Nr. 60. CLASSIFICATIONS OF MATHEMATICS in history. EUCLID. MICHAEL STIFEL. CARL FRIEDRICH GAUSS. PRACTICAL GEOMETRY. INSTRUMENTS. TEXTBOOKS. (IM) #17.4.64

FUKAGAWA, H., AND PEDOE, D. 1989. *Japanese temple geometry problems*. Winnipeg: Charles Babbage Research Centre. xvi + 206 pp. The first publication in a Western language of a book on JAPANESE TEMPLE GEOMETRY. It contains several results involving ellipses and circles that have never appeared in the West as well as two that were known before their subsequent discovery in the West. (DEZ) #17.4.65

GAINDIRK, K. V. 1982. Main directions in mathematical research at the Academy of Sciences of the MOLDAVIAN SSR. *Izvestiya Akademii Nauk Moldavskoi SSR. Seriya Fiziko-Tekhnicheskikh i Matematicheskikh Nauk* No. 3, 3–10. *Mathematical Reviews* **85b:**01095. [In Russian] (ACL) #17.4.66

GARCÍA VELARDE, MANUEL. 1990. Una década de divulgación científica en España: La Barraca de la Ciencia. *Arbor* **135** (530), 35–48. SCIENTIFIC DIVULGATION. SPAIN. (VA) #17.4.67

GATTESCHI, LUIGI. 1981. GUIDO FUBINI's contribution to ITERATIVE ALGORITHMS. *Atti della Academia delle Scienze di Torino. Classe di Scienze Fisiche, Matematiche e Naturali* **115,** 61–70. On Fubini's two papers of 1897 and 1898 on iterative algorithms for calculating elementary transcendental functions. *Mathematical Reviews* **85c:**01024. [In Italian] (ACL) #17.4.68

GEKKER, I. R., AND EULER, A. A. 1988. The family and descendants of LEONHARD EULER. Pp. 468–497 in #16.4.16. [In Russian] (IA) #17.4.69

GEKKER, I. R. *See* #17.4.6.

GERDES, PAUL. 1989. Sobre aritmética e ornamentição geométrica. Análise de alguns cestos de

indios do Brasil. *Quipu: Revista Latinoamericana de Historia de las Ciencias y la Tecnología* **6**, 171–187. ETHNOMATHEMATICS and early mathematical thinking. (VA) #17.4.70

GERTSMAN, E. V. 1988. LEONHARD EULER and the history of a musico-mathematical idea. Pp. 321–332 in #16.4.16. Details the development of Euler's work on harmonics, with emphasis on his 1739 work *Tentamen novae theoriae musicae* and the influence which Euler's work had on the development of the mathematical theory of harmony. MUSIC. [In Russian] (IA) #17.4.71

GIACARDI, LIVIA. 1990. Memorial days in honour of Angelo Genocchi. *Historia Mathematica* **17**(1), 66–67. List of speakers, with titles of presentations, at a meeting held May 12–13, 1989, in Turin, Italy, to evaluate the work of the mid-19th century Italian mathematician ANGELO GENOCCHI. *See also* #17.4.102. (DEZ) #17.4.72

GILMER, GLORIA F., AND WILLIAMS, SCOTT W. 1990. An interview with CLARENCE STEPHENS. *UME Trends* **2**(1), 1 and 4. Stephens is a black American mathematician who has conducted eminently successful undergraduate programs. In the interview he discusses his education and the influences on his choice of career. (DEZ) #17.4.73

GIUSTI, ENRICO. *See* #17.4.49.

GOODSTEIN, JUDITH R. 1982/83. The Italian mathematicians of relativity. *Centaurus* **26**, 241–261. The role of ITALIAN MATHEMATICIANS in the development of Einstein's THEORY OF RELATIVITY. *Mathematical Reviews* **85c:**01033. (ACL) 17.4.74

GRANT, HARDY. 1990. Geometry and politics: Mathematics in the thought of THOMAS HOBBES. *Mathematics Magazine* **63**(3), 147–154. An analysis of Hobbes' application of mathematics to POLITICAL SCIENCE. (DEZ) #17.4.75

GRAU, K. 1988. LEONHARD EULER and the Berlin Academy of Sciences. Pp. 81–92 in #16.4.16. Euler spent the years from 1741 to 1766 in BERLIN at the ACADEMY OF SCIENCES. About a third of his publications (and about half of his life's work) belong, as Yushkevich has shown, to this quarter century. Euler's correspondence, judging by the surviving letters, was particularly intensive during his Berlin period. An examination is made of the scientific world and of Euler's life during the period. [In Russian] (IA) #17.4.76

GREBENIKOV, E. A. *See* #17.4.1.

GRIFFIN, NICHOLAS, AND LEWIS, ALBERT C. 1990. Bertrand Russell's mathematical education. *Notes and Records of the Royal Society of London* **44**, 51–71. Collects together direct and indirect information on BETRAND RUSSELL'S earliest mathematical education through his CAMBRIDGE UNIVERSITY undergraduate years, 1890–1893, and attempts to assess the influence this largely inadequate training had on his later philosophical development. (ACL) #17.4.77

GRIGORYAN, A. T. 1989. NEWTON and Newtonian studies in Russia and the USSR. *Dijalektika* **24**(1–2), 55–66. [In Russian] (IM) #17.4.78

GRIGORYAN, A. T., AND KIRSANOV, V. S. 1988. "Letter to a German Princess" and the PHYSICS of LEONHARD EULER. Pp. 294–303 in #16.4.16. [In Russian] (IA) #17.4.79

GUERREIRO, J. C. SANTOS. *See* #17.4.177.

GUICCIARDINI, NICCOLÒ. 1989. *The development of Newtonian* CALCULUS *in Britain, 1700–1800.* Cambridge/New York: Cambridge Univ. Press. xii + 228 pp. $54.50. A survey of the method of fluxions in 18th-century Britain. The author takes issue with many of the accepted views of the state of BRITISH MATHEMATICS in this period. He demonstrates that important contributions were made in the fields of integration, series, and applied mathematics. He argues that the British were not nearly so bound to geometric methods as has been believed. He reconsiders the basis of the gap which developed between British and Continental mathematics. He shows that the period of reform was much

more complex and that it began much earlier than is usually believed. There are several useful appendices, including tables of the names and tenures of those who held the various chairs and professorships of mathematics in British universities and military academies. (ES) #17.4.80

GUTIÉRREZ RÍOS, ENRIQUE. 1990. El consejo superior de investigaciones científicas. Su gestación y su influjo en el desarrollo científico español. *Arbor* **115**(529), 75–97. SCIENCE HISTORY. INSTITUTIONS. SPAIN. (VA) #17.4.81

HAKEN, W. *See* #17.4.11.

HALL, MARSHALL, JR. 1988. Mathematical biography. Pp. 367–373 in #17.4.56. Chronologically ordered account of Hall's mathematical endeavors. Degrees, positions held, and main theorems are mentioned, along with comments on personalities encountered. (SA) #17.4.82

HALMOS, P. R. 1988. Some books of auld lang syne. Pp. 131–174 in #17.4.56. The author recounts his experiences with 26 well-known books (mainly TEXTBOOKS) and provides synopses of their contents. Under calculus, for example, are R. S. Burington and C. C. Torrance, *Higher mathematics* (1939) ("Are books like this still being written, and, more to the point, are books like this still being used in undergraduate courses?") and G. H. Hardy, *A course of pure mathematics* (1908) ("The toughest, most challenging, most rewarding, and most mathematical calculus book that you could possibly imagine."). (ACL) #17.4.83

HAMMING, R. W. 1988. The use of mathematics. Pp. 429–437 in #17.4.56. "The idea that mathematics is a socially useful invention of the human mind rather than merely the 'art for art's sake' of the pure mathematicians differs enough from what is usually taught (by implication) in school that it seems necessary to trace some of the steps by which I came to this view." (ACL) #17.4.84

HARRIS, JOHN. 1987. Australian aboriginal and islander mathematics. *Australian Aboriginal Studies* **2**, 29–37. The author, a linguist with experience as a teacher in Aboriginal schools, presents an account of the usage of aboriginal numbers, and an instructive account of the origin and propagation of fallacious statements to be found in standard literature. (NP) #17.4.85

HAWKINS. THOMAS. 1989. Line geometry, differential equations, and the birth of Lie's theory of groups. Pp. 275–327 in *The history of modern mathematics, I.* (*See* #17.3.108.) An investigation of the early work (1869–1872) of SOPHUS LIE on LINE GEOMETRY and DIFFERENTIAL EQUATIONS with relation to the emergence of his THEORY OF GROUPS based on both published and unpublished material during that period. The author studies the work in three stages, discussing the interaction with FELIX KLEIN in all of them. Lie's dependence on JACOBI is described. (DEZ) #17.4.86

HELGASON, SIGURDUR. 1990. A centennial: WILHELM KILLING and the exceptional groups. *The Mathematical Intelligencer* **12**(3), 54–57. A commentary on Killing's epoch-making paper on simple Lie algebras. The author supplements the discussion of Killing's work as described by John Coleman in #17.1.16. (DEZ) #17.4.87

HENDERSON, L. D. 1983. *The fourth dimension and non-Euclidean geometry in modern art.* Princeton, NJ: Princeton Univ. Press. 453 pp. Reviewed by S. Sigurdsion in *Isis* **80**(4), 737–738. The author analyzes how popular interest in non-Euclidean, higher-dimensional geometries and relativity around the turn of the century bears on the history of such artistic movements as cubism, De Stijl, futurism, and suprematism. "Henderson does not explain sufficiently how the diffusion and appropriation of scientific knowledge took place. An exploration in greater depth of how changes in artistic practice around 1900 were dictated by problems internal to art itself would have been desirable." GEOMETRY AND ART. (GB) #17.4.88

HERZ-FISCHLER, R. 1987. *A mathematical history of division in extreme and mean ratio.* Waterloo,

Ontario: Wilfrid Laurier Univ. Press. 208 pp. Reviewed by Gyula Mayer in *Centaurus* **32**(2), 244–245. "The author gives a detailed, clear and unbiased account of the sometimes extremist opinions in question [A. Zeising's and others' mystical 'golden numberism'], and so does he in the case of geometrical algebra." (GB) #17.4.89

HERZ-FISCHLER, ROGER. 1990. Dürer's paradox or why an ellipse is not egg-shaped. *Mathematics Magazine* **63**(2), 75–85. A brief discussion of some mathematical aspects of the work of ALBRECHT DÜRER, including the techniques he used for constructing ellipses. (DEZ) #17.4.90

HEWITT, EDWIN. 1990. So far, so good: My life up to now. *The Mathematical Intelligencer* **12**(3), 58–63. Reminiscences by EDWIN HEWITT, including his childhood, education (with emphasis on his years at HARVARD), military work in World War II, academic positions, travels, and retirement. There are several PHOTOS. Hewitt is the abstracter's academic grandfather. (DEZ) #17.4.91

HILTON, PETER. 1988. Reminiscences of BLETCHLEY PARK, 1942–1945. Pp. 291–301 in #17.4.56. The techniques of CRYPTANALYSIS used in breaking the German Enigma code. Memories and evaluations of ALAN TURING, J. H. C. WHITEHEAD, and M. H. A. NEWMAN. (ACL) #17.4.92

HIRIART-URRUTY, J.-B. 1990. Historical associations of FERMAT in Beaumont and Toulouse, France. *The Mathematical Intelligencer* **12**(2), 52–53. One PHOTO shows the house where Fermat was born in Beaumont; two others show statues of him in Beaumont and Toulouse. (DEZ) #17.4.93

HOGAN, EDWARD R. 1990. The fading amateur: WILLIAM LENHART and 19th-century American mathematics. *Historia Mathematica* **17**(1), 6–15. The life and work of William Lenhart (1787–1840), one of the leading American mathematicians of his generation. His status as an amateur pitted him against professional scientists like BENJAMIN PEIRCE who sought to distance themselves from amateurs. DIOPHANTINE ANALYSIS. (DEZ) #17.4.94

HOGENDIJK, J. P. 1989. The mathematical structure of two Islamic astrological tables for 'Casting the rays.' *Centaurus* **32**(2), 171–202. In medieval ISLAMIC astrology the sun, the moon, and each planet were believed to cast seven rays, meeting the ecliptic in seven significant points. Three of the rays were believed to be determined by the sides of a regular hexagon, square, and equilateral triangle, respectively. Tables for the positioning of these regular polygons were first developed by Mohammed ibn Musa AL-KHOWARIZMI and updated by the Andalusian astronomer Maslama ibn Ahmad AL-MAJRITI about 1000 A.D. The mathematical structure of the Majriti tables is completely analyzed. (GB) #17.4.95

HOWSON, GEOFFREY. 1989. Applications in the history of mathematics teaching. *LLULL* **12** (23), 365–395. EDUCATION and MATH HISTORY. (VA) #17.4.96

HØYRUP, JENS. 1987. Zur Frühgeschichte algebraischer Denkweisen: ein Beitrag zur Geschichte der Algebra. *Filosofi og Videnskabsteori på Roskilde Universitetscenter.* 3. Række: Preprints og Reprints 1987 Nr. 3. Early history of ALGEBRAIC THOUGHT, especially BABYLONIAN. The author describes a "subscientific" tradition oriented towards practical aspects of mathematics and independent of the formal mathematics represented by the later Greek tradition. (ACL) #17.4.97

HØYRUP, JENS. 1990. Archimedism, not Platonism: On a malleable ideology of Renaissance mathematicians (1400 to 1600), and on its role in the formation of seventeenth-century philosophies of science. *Filosofi og Videnskabsteori på Roskilde Universitetscenter.* 3. Række: Preprints og Reprints 1990 Nr. 1. A contribution to *Atti del convegno "Archimede, mito tradizione scienza," Syracuse e Catania, 9–12 ottobre 1989.* Argues that ARCHIMEDISM rather than PLATONISM served "as an example and as a navigation mark to RENAISSANCE mathematicians." (ACL) #17.4.98

HØYRUP, JENS. 1990. Subscientific mathematics: Observations on a premodern phenomenon. *History of Science* **28**(1), 63–87. The distinction between "scientific knowledge" and "subscientific knowledge" is analyzed by looking at "new observations" on some well-known material from BABYLONIAN,

GREEK, and ISLAMIC mathematics. The distinction concerns knowledge which is pursued systematically and for its own sake beyond the level of everyday knowledge (scientific), and knowledge which is acquired and transmitted in view of its applicability (subscientific). (GB) #17.4.99

INDORATO, L., AND MASOTTO, G. 1989. Poincaré's role in the Cremieu–Pender controversy over electric convection. *Annals of Science* **46**(2), 117–163. The correspondence between POINCARÉ and CREMIEU shows that many of the latter's experiments were conceived by Poincaré and carried out with his guidance. (GB) #17.4.100

ISAACS, M., LICHTMAN, A., PASSMAN, D., SEHGAL, S., SLOANE, N. J. A., AND ZASSENHAUS, H. (Eds.) 1989. *Representation theory, group rings, and coding theory*. Providence: Amer. Math. Soc. 376 pp. Softcover. $48. A book devoted to the memory of the Soviet mathematician S. D. BERMAN (1922–1987). The first five articles deal with his contributions to REPRESENTATION THEORY, GROUP RINGS, and CODING THEORY. (DEZ) #17.4.101

ISHLINSKII, A. Yu. *See* #17.4.20.

ISRAEL, GIORGIO. 1990. On correspondence between B. Boncompagni and A. Genocchi. *Historia Mathematica* **17**(1), 48–54. A short account of the collection of letters between the prince BALDASSARRE BONCOMPAGNI and the Italian mathematician and historian of medieval mathematics ANGELO GENOCCHI. *See also* #17.4.72. (DEZ) #17.4.102

JONES, M. L. *See* #17.4.138.

KASTANIS, NIKOS. 1990. The first Greek conference on history and philosophy of mathematics—Theme: History and philosophy of ancient Greek mathematics. *Historia Mathematica* **17**(1), 65–66. List of speakers, with titles of presentations, at a meeting held March 2–4, 1989, in Athens, Greece. GREEK MATHEMATICS. (DEZ) #17.4.103

KATZ, VICTOR. 1990. Canadian Society for History and Philosophy of Mathematics. *History and Pedagogy of Mathematics Newsletter* **20**, 10–11. Short synopses of talks given at the annual meeting of the Society held May 31–June 1, 1990, in Victoria, Canada. (DEZ) #17.4.104

KHOLSHEVNIKOV, K. V. *See* #17.4.145.

KIRSANOV, V. S. *See* #17.4.79.

KLEENE, STEPHEN C. 1988. The role of logical investigations in mathematics since 1930. Pp. 85–91 in #17.4.56. The work of Kleene, Church, Turing, Gödel and others on algorithmic COMPUTABILITY is given as an example of how investigations in logic have shed important light on preexisting mathematical enterprises. (ACL) #17.4.105

KNOBLOCH, E. 1988. The mathematical notebooks of LEONHARD EULER. Pp. 102–121 in #16.4.16. Russian translation by I. A. Golovinskii. Describes the writings in Euler's notebooks on mathematical topics; there are sections on number theory, general algebraic problems and algebraic equations, probability theory, combinatorics and game theory, series, continued fractions, differential and integral calculus, differential equations, geometry, differential geometry, and the calculus of variations. Short sections also include a brief catalog of Euler's writings on astronomy, physics, and various other subjects. [In Russian] (IA) #17.4.106

KNOBLOCH, EBERHARD. 1990. Mathematics at the Berlin Technische Hochschule/Technische Universität: Social, institutional, and scientific aspects. Pp. 251-284 in #17.4.162. A description of the social, institutional, and scientific role that mathematics played in the BERLIN TECHNISCHE HOCHSCHULE, the leading Prussian technological training institution. The paper includes chronological tables of mathematics teachers at four institutions in Berlin. (DEZ) #17.4.107

KNOBLOCH, EBERHARD. *See* #17.4.64.

KNUTH, DONALD E. 1988. Algorithmic themes. Pp. 439–445 in #17.4.56. "Analysis of algorithms is only one small aspect of the interaction between mathematics and computer science. I have chosen to mention a few autobiographical examples. . . ." (ACL) #17.4.108

KOBLITZ, NEAL. 1990. Recollections of mathematics in a country under siege. *The Mathematical Intelligencer* **12**(3), 16–34. An interview with the VIETNAMESE MATHEMATICIAN HOÀNG TUY that includes his reminiscences on his youth, education, academic positions, and international contacts. He discusses the development of mathematics in VIETNAM during wars with several countries up to the present, and educational reforms that have taken place in the country. The influence of LÊ VĂN THIÊM is cited, as is his contact with leading Vietnamese political figures, including HO CHÍ MINH. OPERATIONS RESEARCH. (DEZ) #17.4.109

KOPELEVICH, Yu. Kh. 1988. EULER—ordinary and honorary member of the PETERSBURG ACADEMY OF SCIENCE. Pp. 47–59 in #16.4.16. A discussion of Euler's scientific work as a member of the Academy of Science, set against the broader background of the history of the academy. [In Russian] (IA) #17.4.110

KRACHT, MANFRED. 1990. E. W. VON TSCHIRNHAUS: His role in early CALCULUS and his work and impact on ALGEBRA. *Historia Mathematica* **17**(1), 16–35. After highlighting the life of Tschirnhaus the paper examines his relationship with Leibniz, discusses the main paper on the Tschirnhaus transformation, describes its impact on the evolution of mathematics, considers another paper by him, and states the most formative factors on his life and work. LEIBNIZ. HERMITE. (DEZ) #17.4.111

KRAFFT, FRITZ, AND SCRIBA, CHRISTOPH J. (Eds.) 1989. *XVIIIth International Congress of History of Science: Abstracts*. Hamburg-München: International Union of the History and Philosophy of Science/Division of History of Science. The following symposia are abstracted separately: Jean Dhombres and Ivor Grattan-Guinness, "Mathematics and the French Revolution: Decades of changes" C22, 1–10; Christian Thiel, "Social history of sciences/disciplines/theories" E1, 1–16; Sergei Demidov and Menso Folkerts, "Historiography and the history of mathematics" M2, 1–13; Herbert H. Mehrtens and Walter Purkert, "Mathematics and the state" R21, 1–14; and Joseph W. Dauben, the commemorative session, "Charles Sanders Peirce" O1, 1–2. (IM) #17.4.112

KRASIĆ, STJEPAN. 1987. *Stjepan Gradić (1613–1683): Life and Work*. Zagreb: Jugoslavenska akademija znanosti i umjetnosti. lxxxi + 521 pp. Illustrated. Djela JAZU, Razred za društvene znanosti, knjiga 67. Riassunto, pp. 515–521. Includes the chapter "Researches into exact sciences," pp. 471–514. STJEPAN GRADIĆ. [In Croatian] (IM) #17.4.113

KUBO, RYOGO. 1979. STATISTICAL MECHANICS: A survey of its one hundred years. Pp. 131–157 in *Scientific culture in the contemporary world*, V. Mathieu and P. Rossi (Eds.) (Milan: Scientia.) Though this survey is intended for the nonspecialist, Paul F. Zweifel, in his review in *Mathematical Reviews* **85c:**01027, recommends it for the specialist as well. (ACL) #17.4.114

KULLMAN, DAVID. 1990. HIMED 90. *History and Pedagogy of Mathematics Newsletter* **20**, 3–5. Short synopses of talks given at the conference on History in Mathematics Education held April 7–9, 1990, at Leicester. (DEZ) #17.4.115

LAFUENTE, ANTONIO, AND DELGADO, A. J. 1984. *La geometrización de la tierra (The geometrization of the earth)*. Madrid: CSIC. 275 pp. Scientific description of the Franco-Spanish geodetic expedition to Ecuador in order to establish the figure of the earth. (VA) #17.4.116

LAFUENTE, ANTONIO, AND MAZUELOS, ANTONIO. 1987. *Los caballeros del punto fijo: Ciencia, política y aventura en la expedición geodésica al Virreinato del Perú en el siglo XVIII (The gentlemen of the fixed point: Science, politics and adventure in the geodetic expedition to the Viceroyalty of Peru in the 18th century)*. Madrid/Barcelona: CSIC/Ediciones del Serbal. 256 pp. Description of the Franco-Spanish geodetic expedition to Ecuador to establish the figure of the earth. (VA) #17.4.117

LAUDAN, L. *See* #17.4.52.

LAUDAN, R. *See* #17.4.52.

LAVRINEKO, T. A. 1988. Diophantine equations in the work of L. EULER. Pp. 153–165 in #16.4.16. Euler's work on DIOPHANTINE EQUATIONS is rooted in his work on cubic algebraic curves. [In Russian] (IA) #17.4.118

LEWIS, ALBERT C. *See* #17.4.77.

LICHTMAN, A. *See* #17.4.101.

LIPSON, STANLEY H. *See* #17.4.3.

LLOYD, E. KEITH. 1990. Redfield's proofs of MacMahon's conjecture. *Historia Mathematica* **17**(1), 36–47. An explanation of a conjecture of Major PERCY ALEXANDER MACMAHON on SYMMETRIC FUNCTIONS and its resolution by J. HOWARD REDFIELD based on unpublished papers and correspondence. DETERMINANTS. (DEZ) #17.4.119

LÓPEZ-PIÑERO, JOSÉ M., NAVARRO, VÍCTOR, AND PORTELA, EUGENIO. 1989. *La revolución científica (The scientific revolution)*. Biblioteca Histórica No. 16. Madrid: CSIC/Universidad de Valencia. First SCIENTIFIC REVOLUTION (VA) #17.4.120

LORA TAMAYO, MANUEL. 1990. Recuerdos del consejo superior de investigaciones científicas en su 50° aniversario. *Arbor* **115**(529), 99–115. SCIENCE HISTORY. INSTITUTIONS. SPAIN. (VA) #17.4.121

LUCHINS, EDITH H. *See* #17.4.122.

LUCHINS, ABRAHAM S., AND LUCHINS, EDITH H. 1990. The Einstein–Wertheimer correspondence on geometric proofs and mathematical puzzles. *The Mathematical Intelligencer* **12**(2), 35–43. The publication of three letters between ALBERT EINSTEIN and MAX WERTHEIMER, the chief founder of Gestalt psychology. Einstein discusses his notion of the beauty of a proof and solves two brain-teasers posed by Wertheimer. (DEZ) #17.4.122

LUČIĆ, JOSIP. 1988. Colloque international à Paris "La rencontre des cultures et des domaines du savoir chez R. J. Bošković." *Synthesis Philosophica* **3**, 643–646. French version of the essay review abstracted in #16.3.44. BOŠKOVIĆ'S CONTRIBUTIONS TO MATHEMATICS AND SCIENTIFIC METHODOLOGY. (IM) #17.4.123

MAC LANE, SAUNDERS. 1988. Concepts and categories in perspective. Pp. 323–365 in #17.4.56. Brief but documented histories of topics which "aim to summarize some of the high points in the development of the conceptual approach to the last 60 years of American mathematics, with particular attention to CATEGORY THEORY and my own part in this development." (ACL) #17.4.124

MANDRYKA, A. P. 1988. The significance of LEONHARD EULER'S studies in BALLISTICS. Pp. 233–236 in #16.4.16. [In Russian] (IA) #17.4.125

MARTINOVIĆ, IVICA. 1988. A new landmark in the research on BOŠKOVIĆ'S scientific work. *Anali Zavoda za povijesne znanostic Jugoslavenske akademije znanosti i umjetnosti* **26**, 256–259. Essay review of Žarko Dadić's *Rugjer Bošković* (Zagreb, 1987) abstracted in #15.4.15. [In Croatian] (IM) #17.4.126

MARTINOVIĆ, IVICA. 1988. The fundamental work on the polymath STJEPAN GRADIĆ. *Anali Zavoda za povijesne znanostic Jugoslavenske akademije znanosti i umjetnosti* **26**, 255–256. Essay review of Stjepan Krasić's *Stjepan Gradić (1613–1683): Život i djelo* (Zagreb, 1987) abstracted in #17.4.113. [In Croatian] (IM) #17.4.127

MARTINOVIĆ, IVICA. 1989. Bošković on his own theory of forces: From a sentence to the theory of

natural philosophy. Pp. 533–542 in #17.4.130. The role of the PRINCIPLE OF CONTINUITY for the development of BOŠKOVIĆ's THEORY OF FORCES and for the self-consciousness of this scientist. (IM) #17.4.128

MARTINOVIĆ, IVICA (Ed.) 1989. RUGJERT JOSIP BOŠKOVIĆ: Philosophy and science. A special issue of *Synthesis Philosophica* **4**, 509–680. Includes the part "Philosophy of Mathematics," pp. 557–589. Most papers pertinent to the history and philosophy of mathematics are abstracted separately in the present list but some were abstracted in *Historia Mathematica* **17**(3). (IM) #17.4.129

MARTZLOFF, JEAN-CLAUDE. 1990. Deuxième colloque maghrébin sur l'histoire des mathématiques arabes. *Historia Mathematica* **17**(1), 67–69. List of speakers, with titles of presentations, at a meeting held December 1–3, 1988, in Tunis, Tunisia, on the history of ARAB MATHEMATICS in Medieval Maghrib. (DEZ) #17.4.130

MARTZLOFF, JEAN-CLAUDE. 1990. Séminaire sur la géometrie des figures à travers les âges. *Historia Mathematica* **17**(1), 69–70. List of speakers, with titles of presentations, at a meeting held July 1–3, 1989, in Oran, Algeria, on the GEOMETRY OF FIGURES throughout all eras. (DEZ) #17.4.131

MASOTTO, G. *See* #17.4.100.

MASSEY, W. S. 1988. Reminiscences of forty years as a mathematician. Pp. 405–412 in #17.4.56. A brief history of the author's education and an analysis of influences upon it. Changes in the research environment due to fluctuations in government support for mathematical research and the supply and demand of mathematicians since World War II are examined. (SA) #17.4.132

MATVIEVSKAYA, G. P. 1988. On the manuscript heritage and notebooks of EULER. [In Russian] Pp. 122–129 in #16.4.16. Presents the history of Euler's mathematical *Nachlaß*. (IA) #17.4.133

MATVIEVSKAYA, G. P., AND OZHIGOVA, E. P. 1988. EULER's manuscript materials on NUMBER THEORY Pp. 130–138 in #16.4.16. From the paper: "Number theory constitutes a large part of Euler's work. Approximately one sixth of his published work makes use of results, methods, or applications of number theory. The same ratio characterizes the manuscripts and letters preserved in Soviet archives." This work is briefly surveyed by the authors. [In Russian] (IA) #17.4.134

MAULDIN, R. DANIEL, SHORTT, R. M., AND SILVA, CESAR E. (Eds.) 1989. *Measure and measurable dynamics*. Providence: American Mathematical Society. 336 pp. Softcover. $48. A book devoted to the American mathematician DOROTHY MAHARAM STONE (1917–). Two articles deal with her work: J. R. Choksi, S. J. Eigen, J. C. Oxtoby, and V. S. Prasad, "The work of Dorothy Maharam on MEASURE THEORY, ERGODIC THEORY, and CATEGORY ALGEBRAS," and W. A. J. Luxemburg, "The work of Dorothy Maharam on kernel representations of LINEAR OPERATORS." (DEZ) #17.4.135

MAYER, GYULA. *See* #17.4.89.

MAZUELOS, ANTONIO. *See* #17.4.117.

MCCLEARY, JOHN. *See* #17.4.162.

MERZBACH, U. C. *See* #17.4.56.

MEYER, HEINER. 1983. Über einige naturphilosophische Diskussionen im Zusammenhang mit der Begründung der Mengentheorie durch Georg Cantor. *Wissenschaftliche Zeitschrift der Humboldt-Universität Berlin. Mathematisch-Naturwissenschaftliche Reihe* **32**, 301–304. On some discussions on the philosophy of nature in connection with GEORG CANTOR's foundation of SET THEORY. *Mathematical Reviews* **85c:**01028. (ACL) #17.4.136

MIKHAILOV, G. K., AND SEDOV, L. I. 1988. Foundations of MECHANICS and HYDRODYNAMICS in the work of L. EULER. Pp. 166–179 in #16.4.16. [In Russian] (IA) #17.4.137

MIKHAILOV, G. K. *See* #17.4.6.

MILLÁN, ANA. *See* #17.4.17 and #17.4.18.

MILLS, A. A., AND JONES, M. L. 1989. Three lenses by Constantine Huygens in the possession of the Royal Society of London. *Annals of Science* **46**(2), 173–182. A discussion of the three long-focus simple lenses possessed by the Royal Society and inscribed with the signature of CONSTANTINE HUYGENS (elder brother of CHRISTIAN HUYGENS). (GB) #17.4.138

MITROPOLSKI, YU. A., AND BOGOLYUBOV, A. N. 1983. The development of mathematics in the Ukraine. *Voprosy Istorii Estestvoznaniya i Tekhniki* No. 2, 100–103. The development of mathematics in the UKRAINE since 1917. *Mathematical Reviews* **85b:**01092. [In Russian] (ACL) #17.4.139

MONNA, A. F. 1983. Where does the development of mathematics lead to? *Nieuw Archief voor Wiskunde. Vierde Serie.* **1**(4), 33–56. An expression of concern for the growth of modern mathematics and for its lack of unity with the natural sciences. *Mathematical Reviews* **85b:**01039. (ACL) #17.4.140

MOORE, GREGORY H. 1989. Toward a history of Cantor's continuum problem. Pp. 79–121 in *The history of modern mathematics, I.* (*See* #17.3.108.) A detailed treatment of the continuum problem from 1878 to 1908. It begins with the reception of set theory following the publication of Cantor's paper in 1878, then treats the work of IVAR BENDIXSON, PAUL TANNERY, BERTRAND RUSSELL, C. S. PEIRCE, ARTHUR SCHOENFLIES, FELIX BERNSTEIN, and FELIX HAUSDORFF. It ends with the work of ERNST ZERMELO in 1908. It also contains a chronology of the significant events in the history of the continuum problem up to 1986. (DEZ) 17.4.141

MUÑOZ RUIZ, EMILIO. 1990. CSIC, una síntesis de tradición y futuro. *Arbor* **115**(529), 13–48. Historical synthesis of the "Consejo Superior de Investigaciones Científicas" (CSIC). SCIENCE HISTORY. INSTITUTIONS. SPAIN. (VA) #17.4.142

NAVARRO, VÍCTOR. *See* #17.4.120.

NEUMANN, PETER M. 1989. On the date of Cauchy's contributions to the founding of the theory of groups. *Bulletin of the Australian Mathematical Society* **40**(2), 293–302. The author shows that a treatise of CAUCHY that is one of the two landmarks in the history of GROUP THEORY was written in the fall of 1845, even though the date on the publication containing it carries the year 1844. The exact chronology is important because Cauchy was apparently stimulated by a paper submitted by BERTRAND to the Paris Academy in March of 1845. (CGF) #17.4.143

NEVSKAYA, N. I. 1988. New information on L. EULER's development as an astronomer and historian of science. Pp. 259–276 in #16.4.16. [In Russian] (IA) #17.4.144

NEVSKAYA, N. I., AND KHOLSHEVNIKOV, K. V. 1988. EULER and the development of CELESTIAL MECHANICS. Pp. 254–258 in #16.4.16. [In Russian] (IA) #17.4.145

NICKLES, T. *See* #17.4.52.

NIVEN, IVAN. 1988. The threadbare thirties. Pp. 209–229 in #17.4.56. Describes the hardships and uncertainties of mathematical life in America in the 1930s. Grades, teaching loads, unemployment, salaries, and the coming of the European emigres are discussed. (SA) #17.4.146

OWENS, LARRY. 1989. Mathematicians at war: Warren Weaver and the applied mathematics panel, 1942–1945. Pp. 287–305 in #17.4.162. An examination of the APPLIED MATHEMATICS PANEL, which was formed in 1942 to coordinate the services of mathematicians and to serve as a clearinghouse for mathematical information pertinent to World War II. The Panel achieved many successes under its director, WARREN WEAVER. However, this essay concentrates on the failures because "its forgotten trials and tribulations illuminate both the uneven development of American mathematics at the outbreak of World War II as well as the imperial ambitions of whose who . . . took the lead in the mobilization of wartime science." (DEZ) #17.4.147

OZHIGOVA, E. P. 1988. About members of the PETERSBURG ACADEMY OF SCIENCES (Academy of Sciences of the USSR) in the published work of L. EULER. Pp. 60–80 in #16.4.16. Examines information obtained about members of the Academy from studies of Euler's writings and, in particular, from preparations of archival materials for publication. [In Russian] (IA) #17.4.148

OZHIGOVA, E. P. *See* #17.4.134.

PAPPAS, JOHN. 1989. R. J. Boscovich et l'Academie des Sciences de Paris. *Dijalektika* **24** (1–2), 43–54. BOŠKOVIĆ. ACADÉMIE DES SCIENCES IN PARIS. [In Serbian, with French summary pp. 52–54] (IM) #17.4.149

PARSHALL, KAREN. 1989. Toward a history of nineteenth-century invariant theory. Pp. 157–206 in *The history of modern mathematics. I.* (*See* #17.3.108.) An examination of INVARIANT THEORY in the mid-19th century. The main work, carried out by Cayley, Sylvester, Aronhold, Clebsch, and Gordon, reveals two distinct, formal approaches to invariant theory. This view is underscored by correspondence between Cayley and Sylvester. It shows that the historical picture is more complicated than the one painted by HERMANN WEYL in 1939. (DEZ) #17.4.150

PARSHALL, KAREN V. H. 1990. A century-old snapshot of American mathematics. *The Mathematical Intelligencer* **12**(3), 7–11. A retrospective view of the American mathematical community toward the end of the 19th century through a survey conducted by FLORIAN CAJORI in that year. (DEZ) #17.4.151

PASSMAN, D. *See* #17.4.101.

PAVIZ, ALEJANDRA. *See* #17.4.164.

PEDOE, D. *See* #17.4.65.

PICUTTI, ETTORE. 1983. The *Flos* of Leonardo Pisano. *Physis, Rivista Internazionale di Storia della Scienza* **25**, 293–387. In Italian with English summary. A translation of LEONARDO OF PISA's Latin manuscript which includes a study of cubic equations, and application of algebra to geometry, and problems that can be reduced to indeterminate first degree systems. *Mathematical Reviews* **85c:**01010. (ACL) #17.4.152

POLYAKHOV, N. N. 1988. EULER's investigations in MECHANICS during his first period in Petersburg. Pp. 229–232 in #16.4.16. [In Russian] (IA) #17.4.153

PORTELA, EUGENIO. *See* #17.4.120.

PRICE, G. BALEY. 1988. The mathematical scene, 1940–1965. Pp. 379–404 in #17.4.56. A number of activities in American mathematics and the author's participation in them are described. (SA) #17.4.154

PRIMO YÚFERA, EDUARDO. 1990. Transición en el CSIC. *Arbor* **115**(529), 49–60. SCIENCE HISTORY. INSTITUTIONS. SPAIN. (VA) #17.4.155

PRINCE, AUGUSTUS. 1989. The phenomenalism of NEWTON and BOSCOVICH: A comparative study. Pp. 591–618 in #17.4.130. Boscovich's CURVE OF FORCES may be analyzed via ORESME's "configuration doctrine" thereby affording the opportunity to possibly describe various phenomena. (IM) #17.4.156

PULTE, HELMUT. 1989. *Das Prinzip der kleinsten Wirkung und die Kraftkonzeptionen der rationalen Mechanik: eine Untersuchung zur Grundlegungsproblematik bei* LEONHARD EULER, PIERRE LOUIS MOREAU DE MAUPERTUIS *und* JOSEPH LOUIS LAGRANGE. Stuttgart: Franz Steiner Verlag. xi + 309 pp. Studia Leibnitiana, Sonderheft 19. The early history of the PRINCIPLE OF LEAST ACTION. RATIONAL MECHANICS. (IM) #17.4.157

PULVER, SANDRA M. 1990. The syncopated mathematical works of JOSEPH SOLOMON DELMEDIGO. *Pi Mu Epsilon Journal* **9**(2), 106–109. Delmedigo (1591–1655) was a rabbi from CRETE. This note examines the NOTATION used in his sole extant work. (DEZ) #17.4.158

PURKERT, WALTER. 1990. 29. Tagung zur Geschichte der Mathematik. *Historia Mathematica* **17**(1), 55–64. The 29th meeting on the history of mathematics held November 20–26, 1988, at the OBERWOLFACH Mathematics Research Institute, 1988. Summaries of the 30 talks on the theme of the history of APPLIED MATHEMATICS are given. In addition to the traditional applications in astronomy, mechanics, celestial mechanics, and mathematical physics, there are also treatments of the relations of mathematics to engineering, crystallography, and chemistry. (ACL) #17.4.159

RASKIN, N. M. 1988. LEONHARD EULER and I. I. P. Kulibin. Pp. 304–320 in #16.4.16. The Russian physicist–inventor IVAN PETROVICH KULIBIN was influenced by Euler's work in mechanics. [In Russian] (IA) #17.4.160

REICH, KARIN. *See* #17.4.64.

RICHARDS, JOAN. *See* #17.4.185.

ROCHBERG-HALTON, G. 1989. Babylonian seasonal hours. *Centaurus* **32**(2), 146–170. The author analyzes the BABYLONIAN (post-600 B.C.) way of dividing up the day into hours by examining the Babylonian horoscopes of the Seleucid period (ca. 300–50 B.C.) and the updated procedures for construction of a gnomon (sundial). (GB) #17.4.161

ROWE, DAVID E., AND MCCLEARY, JOHN. 1989. *The history of modern mathematics. Volume II: Institutions and applications*. San Diego: Academic press. xvi + 325 pp. Hardbound. $37.50. A collection of 11 essays that resulted from lectures at the Symposium on the History of Modern Mathematics held June 20–24, 1988, at Vassar College. The two major topics in this second of two volumes are the relations between PHYSICS and mathematics and the tension between pure and APPLIED MATHEMATICS as they arose in 19th-century France, Wilhelmian Germany, and the U.S. during World War II. The first volume was abstracted in #17.3.108. The articles are abstracted separately. 19TH CENTURY. 20TH CENTURY. (DEZ) #17.4.162

RUMYANTSEV, V. V. 1988. LEONHARD EULER and variation principles in MECHANICS. Pp. 180–207 in #16.4.16. [In Russian] (IA) #17.4.163

SAGASTI, FRANCISCO R., AND PAVIZ, ALEJANDRA. 1989. Ciencia y tecnología en América Latina a principios del siglo XX: Primer congreso científico latinoamericano. *Quipu: Revista Latinoamericana de Historia de las Ciencias y la Tecnología* **6**, 189–216. An approach to the study of LATIN AMERICAN SCIENCE through the analysis of the Fourth Scientific Congress (first Pan American) held in Santiago, Chile, 1908–1909. (VA) #17.4.164

SALDAÑA, JUAN JOSÉ. 1989. Dinámica de la tecnología en Iberoamérica. *Quipu: Revista Latinoamericana de Historia de las Ciencias y la Tecnología* **6**, 45–54. Proposal of a historical model for the study of the dynamics of technology in LATIN AMERICA. (VA) #17.4.165

SÁNCHEZ DEL RÍO, CARLOS. 1990. La investigación científica en España y el CSIC. *Arbor* **115**(529), 61–73. SCIENCE HISTORY. INSTITUTIONS. SPAIN. (VA) #17.4.166

SÁNCHEZ RON, J. M. (Ed.) 1988. *La Junta para Amplicación de Estudios e Investigaciones Científicas ochenta años después*. 2 Vols. Madrid: CSIC. POLITICS AND HISTORY of SPANISH SCIENTIFIC DEVELOPMENT and RESEARCH. 20th Century. (VA) #17.4.167

SARASON, DONALD. 1990. The exact answer to a question of Shields. *The Mathematical Intelligencer* **12**(2), 18–19. ALLEN SHIELDS did not know who invented the term "exact sequence." The author traces it to EILENBERG and STEENROD. (DEZ) 17.4.168

SCHOLZ, ERHARD. 1989. Crystallographic symmetry concepts and group theory (1850–1880). Pp.

3–28 in #17.4.162. The author shows that the abstract theory of GEOMETRICAL GROUPS inaugurated by CAMILLE JORDAN in 1869 was adumbrated by early 19th-century crystallographers. The paper includes an analysis of the implicit group-theoretic elements in the work of AUGUST BRAVAIS on crystal structure, a discussion of Jordan's fundamental memoir, and an examination of Jordan's influence on the transformation groups of Lie and Klein. (DEZ) #17.4.169

SCHRÖDER, WILFRIED. 1988. Albert Einstein in seinen Beziehungen zu Mitgliedern der Gesellschaft der Wissenschaften in Göttingen. *Archive for History of Exact Sciences* **39**, 157–171. ALBERT EINSTEIN in relation to the members of the Göttingen Science Society. The reception of Einstein's work in Göttingen is described. Also, the important but unacknowledged influence of WOLDEMAR VOIGT, professor of theoretical physics at Göttingen, is especially noted. (ACL) #17.4.170

SCRIBA, CHRISTOPH J. *See* #17.4.112.

SEDOV, L. I. *See* #17.4.137.

SEHGAL, S. *See* #17.4.101.

SHAPIRO, HAROLD. 1990. ALLEN LOWELL SHIELDS—Some reminiscences. *The Mathematical Intelligencer* **12**(2), 8–10. The author recalls his days as a fellow student with Shields. (DEZ) #17.4.171

SHAPIRO, JOEL H. 1990. On being Allen's student. *The Mathematical Intelligencer* **12**(2), 15–17. The author reveals that "beneath that gentle exterior [of ALLEN SHIELDS] lurked a very tough advisor!" (DEZ) #17.4.172

SHAPIRO, STEWART. 1983. Remarks on the development of COMPUTABILITY. *History and Philosophy of Logic* **4**, 203–220. *Mathematical Reviews* **85c:**01037. (ACL) #17.4.173

SHESTAKOVA, M. V. 1988. Descendants of LEONHARD EULER in the line of his son Karl. Pp. 498–505 in #16.4.16. [In Russian] (IA) #17.4.174

SHORTT, R. M. *See* #17.4.135.

SIGURDSION, J. *See* #17.4.88.

SILVA, CESAR E. *See* #17.4.135.

SLOANE, N. J. A. *See* #17.4.101.

SMALE, STEVE. 1990. The story of the higher dimensional Poincaré conjecture (What actually happened on the beaches of Rio). *The Mathematical Intelligencer* **12**(2), 44–51. The author supplies evidence to support his primacy in settling the POINCARÉ CONJECTURE to redress inaccuracies in other accounts. He includes correspondence with JOHN MILNOR, JOHN STALLINGS, and CHRISTOPHER ZEEMAN. What actually happened on the beach was that Smale did mathematics. TOPOLOGY. (DEZ) #17.4.175

STIGLER, STEPHEN M. 1986. *The history of* STATISTICS: *The measurement of uncertainty before 1900*. Cambridge: Harvard Univ. Press. xvi + 410 pp. Paperback. A readable, fact-filled survey focused on variability in astronomy and geodesics, probability in social science, and studies of heredity. [Adapted with permission from *The American Mathematical Monthly* **97**(6) (1990), 552] (LAS) #17.4.176

STRUIK, DIRK J. 1989. *Historia concisa das Matemáticas*. Lisbon: Gradiva Publicações. 360 pp. Translation of *A concise history of mathematics* into Portuguese by J. C. Santos Guerreiro. (DS) #17.4.177

STRUIK, DIRK J. 1989. Schouten, Levi-Civita, and the emergence of tensor calculus. Pp. 99–105 in #17.3.162. A discussion of the evolution of TENSOR CALCULUS during the late teens and early twenties

of the 20th century, making reference to the contributions of EINSTEIN, RICCI-CUBASTRO, WEYL, and EDDINGTON, as well as to the 19th-century foundations laid by GAUSS, RIEMANN, and CHRISTOFFEL. Central to the article is the author's personal reminiscence of an independent discovery of the "parallelism of Levi-Civita" by his friend and co-worker, the Dutch engineer-turned-mathematician JAN ARNOLDUS SCHOUTEN. In 1917, TULLIO LEVI-CIVITA published a new concept of parallelism which facilitated differentiation on curved manifolds. Schouten developed an equivalent concept in the same year, during which communications with Italy were slowed by the war, but published the discovery later than Levi-Civita. Schouten used a new notation that made his paper less accessible to other mathematicians. (JCS) #17.4.178

STUMP, D. 1989. HENRI POINCARÉ's philosophy of science. *Studies in history and philosophy of science* **20**(3), 335–363. The "hypothetical method" is the central feature of Poincaré's PHILOSOPHY OF SCIENCE, as he considers it a middle ground between the dogmatic claims of the old guard and the antirealist views of the new vogue in France at the end of the 19th century. For example, Poincaré argues that the geometry of space is a matter of convention, but science will lead geometry to the proper convention. These arguments depend upon a "relationalist program for dynamics" and not on any general philosophical interpretation of science. The author traces Poincaré's development of this relationalist program. (GB) #17.4.179

SYNGE, J. L. 1988. For the 100th birthday of the American Mathematical Society. Pp. 19–20 in #17.4.56. Some memories of earliest contacts with AMERICAN MATHEMATICIANS such as O. Veblen, L. P. Eisenhart, and G. D. Birkhoff. (ACL) #17.4.180

SZÓKEFALVI-NAGI, BÉLA. 1990. LIE and KILLING. *The Mathematical Intelligencer* **12**(2), 24. Letter to the editor disputing Lie's evaluation of Killing's work as described in #17.1.16. (DEZ) #17.4.181

SZYMANSKI, WACLAW. 1990. Who was Otto Nikodym? *The Mathematical Intelligencer* **12**(2), 27–31. A biography of OTTON MARTIN NIKODYM (1887–1974), one of the leaders of the POLISH SCHOOL. After writing a dissertation with no advisor Nikodym taught in high school and several universities until leaving Poland in 1946. His burial place at a special cemetery in the U.S. is located. (DEZ) #17.4.182

TATON, R. *See* #17.4.195.

TOBIES, R. 1982. Die Stellung deutscher mathematischer Fachgesellschaften zur angewandten Mathematik (bis 1917). *Mitteilungen. Mathematische Gesellschaft der Deutschen Demokratischen Republik* No. 1–2, 133–154. The position of GERMAN MATHEMATICAL PROFESSIONAL SOCIETIES vis-à-vis applied mathematics (up to 1917). *Mathematical Reviews* **85b**:01096. (ACL) #17.4.183

TSERLYUK ASKADSKAYA, S. S. 1988. Musico-theoretical manuscripts of LEONHARD EULER and the formation of his conception of MUSIC THEORY. Pp. 333–344 in #16.4.16. [In Russian] (IA) #17.4.184

TYMOCZKO, T. (Ed). 1986. *New directions in the philosophy of mathematics: An anthology*. Boston, MA: Birkhäuser. xvi + 323 pp. Essay review by Joan Richards in *Isis* **80**(4), 669–673. Tymoczko has collected a number of previously published articles to "carry the germ of a major philosophical revision." The key innovation tying the articles together is the insistence that philosophers "abandon the attempt to discover an absolute, rational foundation for mathematics." Instead, the PHILOSOPHY OF MATHEMATICS should be based on the experiences of the mathematical practitioner. Alternative models are given in articles by IMRE LAKATOS and PHILIP KITCHER. The reviewer analyzes Lakatos' quasi-empirical model and the need to use historical perspective to develop a philosophy of mathematics. The new practice-oriented philosophies sketched by Kitcher "cry out for a new kind of inquiry" in the history of mathematics. An example of this kind of new inquiry is the article by GRABINER called "Is mathematical truth time dependent?" (GB) #17.4.185

VAN MAANEN, JAN A. 1983. JOACHIM NIEUSTADT. *Studia Leibnitiana* **15**, 115–119. A mathematician known to Leibniz who was born about 1624, died after 1685. *Mathematical Reviews* **85c:**01038. (ACL) #17.4.186

VELAMAZÁN, MA. ÁNGELES, AND AUSEJO, ELENA. 1989. Los planes de estudio en la Academia de Ingenieros del Ejército de España en el siglo XIX. *LLULL* **12** (23), 415–453. MATHEMATICS in MILITARY INSTITUTIONS. SPAIN. 19th Century. (VA) #17.4.187

VIKTURNINA, M. P. *See* #17.4.7.

VOOLICH, ERICA. 1990. HPM in Salt Lake City. *History and Pedagogy of Mathematics Newsletter* **20**, 7–9. Short synopses of talks given at the meeting of the American Section of the International Study Group on the Relations Between History and Pedagogy of Mathematics, April 17–18, 1990. (DEZ) #17.4.188

WHITNEY, HASSLER. 1988. Moscow 1935: topology moving toward America. Pp. 97–117 in #17.4.56. Turning points in COMBINATORIAL AND GENERAL TOPOLOGY from Euler to 1988. (ACL) #17.4.189

WIDDER, D. V. 1988. Some mathematical reminiscences. Pp. 79–83 in #17.4.56. The author, a former student of G. D. Birkhoff, recounts his memories of prominent mathematicians he met at Harvard, Bryn Mawr, Rice, Chicago, and Cambridge (with G. H. Hardy, 1935–36), as well as on mathematical trips to France (1920) and the U.S.S.R. (1935 and 1966). (ACL) #17.4.190

WILLIAMS, MICHAEL R. 1990. Early calculation. Pp. 3–58 in #17.4.16. A survey of CALCULATION from numeration systems through various abaci and calculating aids (including slide rules) to mechanical calculating machines (including the commercially successful machines of DORR E. FELT.) It traces the improvement in desk calculators in the 20th century, their incorporation into the business world, and their diminished role after the invention of the COMPUTER. (DEZ) #17.4.191

WILLIAMS, SCOTT W. *See* #17.4.73.

WILSON, ROBIN. 1990. INTERNATIONAL CONGRESS of mathematicians. *The Mathematical Intelligencer* **12**(3), 84. Only three international congresses have been commemorated by stamps. (DEZ) #17.4.192

WUSSING, HANS, AND ARNOLD, WOLFGANG (Eds.) 1983. *Biographien bedeutender Mathematiker. Eine Sammlung von Biographien*. Third edition. Berlin: Volk und Wissen Volkseigner Verlag. 535 pp. REFERENCE WORK—BIOGRAPHIES. *Mathematical Reviews* **85c:**01005. (ACL) #17.4.193

YODER, J. *See* #17.4.57.

YUSHKEVICH, A. P. 1988. LEONHARD EULER, life and work. Pp. 15–46 in #16.4.16. An intellectual biography of Euler that also takes into account the importance of Euler's work in mathematics to the present day, both in the USSR and internationally. [In Russian] (IA) #17.4.194

YUSHKEVICH, A. P., AND TATON, R. 1988. The correspondence of LEONHARD EULER with A.-C. CLAIRAUT, J. D'ALEMBERT, and J.-L. LAGRANGE. Pp. 277–293 in #16.4.16. Translation by N. S. Ermolaeva of "Correspondence de Leonhard Euler avec A.-C. Clairaut, J. d'Alembert et J.-L. Lagrange," A. P. Yushkevich and R. Taton (Eds.), *L. Euler, Opera omnia IVA-5* (Basel, Birkhäuser, 1980). [In Russian] (IA) #17.4.195

ZASLAVSKY, CLAUDIA. 1990. World cultures in the mathematics class. *History and Pedagogy of Mathematics Newsletter* **20**, 5–7. Excerpts from the author's talk at the conference on History in Mathematics Education urging the inclusion of historical topics relating to the heritage of minority students in the curriculum of American schools. (DEZ) #17.4.196

ZASSENHAUS, H. *See* #17.4.101.

ZWEIFEL, PAUL F. *See* #17.4.114.